LITEMAX

Sunlight Readable LCD!

ENRICH YOUR VISUAL WORLD…

LITEMAX

DLO1968-U

1600nits 19” LED B/L LCD

User Manual

(1st Edition 29/Sep/2014)

All information is subject to change without notice.

Approved by	Checked by	Prepared by

LITEMAX Electronics Inc.
8F, No.137, Lane 235, Bau-chiau Rd.,
Shin-dian Dist, New Taipei City, Taiwan R.O.C.
Tel : 886-2-8919-1858
Fax: 886-2-8919-1300
Homepage: http://www.litemax.com.tw

RECORD OF REVISION

Version and Date	Page	Old Description	New Description	Remark
29,Sep,2014	All		Initial Release	

Contents

RECORD OF REVISION 2
Contents 3
1.0 GENERAL DESCRIPTION 4
2.0 Electrical characteristics 6
3.0 SIGNAL Characteristic 7
4.0 TIMING Characteristics 11
5.0 CONNECTOR and PIN ASSIGNMENT 13
6.0 OPTICAL SPECIFICATION 14
7.0 LED DRIVING BOARD SPECIFICATIONS 16
8.0 AD2662GDVAR SPECIFICATIONS 17
9.0 MECHANICAL CHARACTERISTICS 35
10.0 PRECAUTIONS 36

1.0 GENERAL DESCRIPTION

DLO1968-U is 19” wide temp. & wide color TFT-LCD module as active switching devices with 1600nits LED backlight powered by Durapixel™ technology. This module has a 19 inch diagonally measured active area with SXGA resolutions (1280 horizontal by 1024 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.

1.1 FEATURES

- Brightness: 1600nits
- LED Backlight
- SXGA(1280x1024) High Definition
- High Shock & Vibration Resistance
- Low Power Consumption
- High Uniformity
- Low EMI Noise
- Wide Dimming
- Wide Temp.: -30~85℃
- Life Expectancy

1.2 GENERAL SPECIFICATIONS

Model No.	DLO1968-U
Description	19” TFT LCD, LED Backlight 1600nits,SXGA(1280x1024), Wide Temp
Display Area (mm)	376.32(H) x 301.06(V)mm
Brightness	1600 cd/m²
Resolution	1280x1024 (SXGA)
Contrast Ratio	1000 : 1
Pixel Pitch (mm)	0.294(H) x 0.294(V)
Viewing Angle	+85°~-85°(H), +80°~-80°(V)
Display Colors	16.7M
Response Time (Typical)	10ms
Power Consumption	43W
Dimensions (mm)	429.2x326x36.4mm
Weight (Net)	3.2kg

DLO= Panel + LED Driving Board + Control Board + Housing

1.3 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+6.0	[Volt]	Note 1,2

Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	-10	+70	[°C]	Note 3
Operation Humidity	HOP	5	95	[%RH]	Note 3
Storage Temperature	TST	-30	+70	[°C]	
Storage Humidity	HST	5	95	[%RH]	

Note 1: With in Ta (25℃)

Note 2: Permanent damage to the device may occur if exceeding maximum values

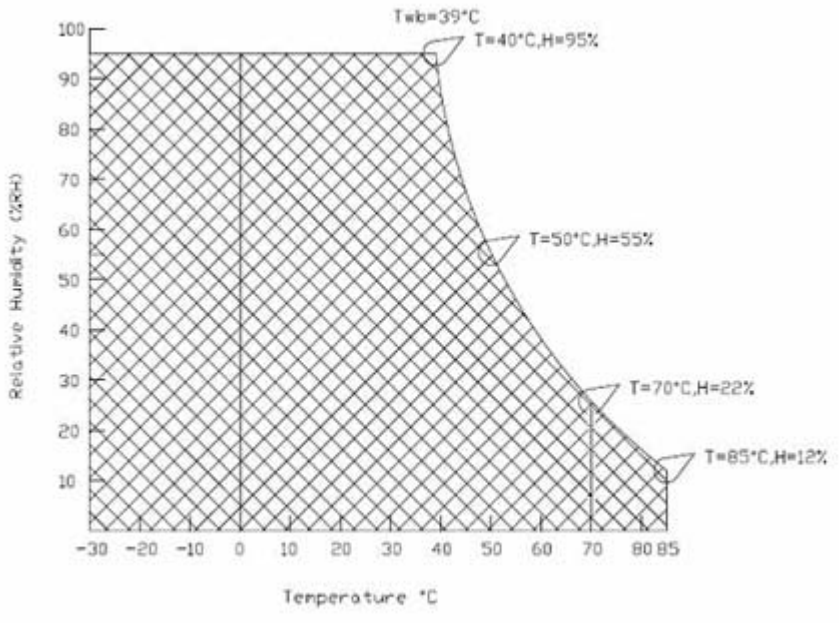
Note 3: Temperature and relative humidity range areshown as the below figure.

1. 95% RH Max (Ta ≦39℃)

2. Max wet-bulb temperature at 39℃ or less. (Ta ≦39℃)

3. No condensation

Note 4: Function Judged only

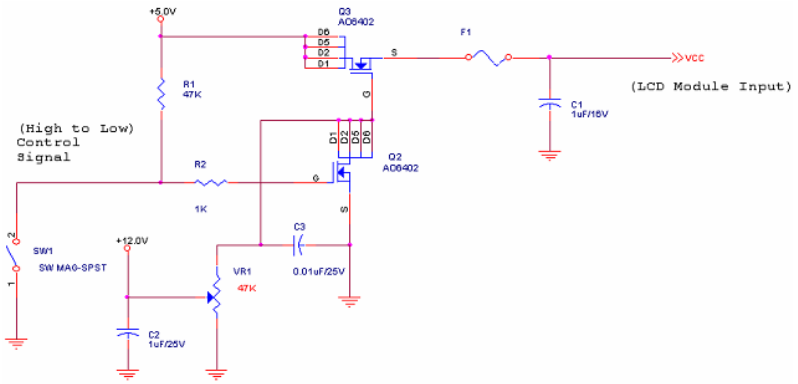


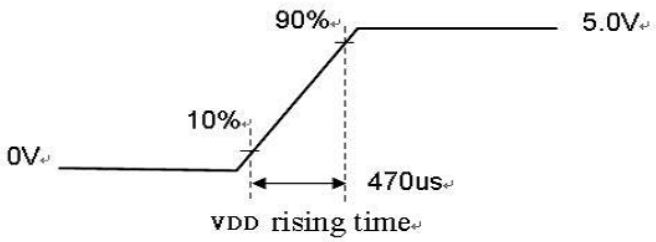
2.0 Electrical characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
VDD	Logic/LCD Drive Voltage	4.5	5.0	5.5	[Volt]	+/-10%
IDD	Input Current	-	1	1.2	[A]	VDD= 5.0V, All Black Pattern At 75Hz (TBD)
PDD	VDD Power	-	5	6	[Watt]	VDD= 5.0V, All Black Pattern At 75Hz (TBD)
IRush	Inrush Current	-	-	3.0	[A]	Note 1
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	VDD= 5.0V, All Black Pattern At 75Hz

Note 1: Measurement conditions:

The duration of rising time of power input is 470us.





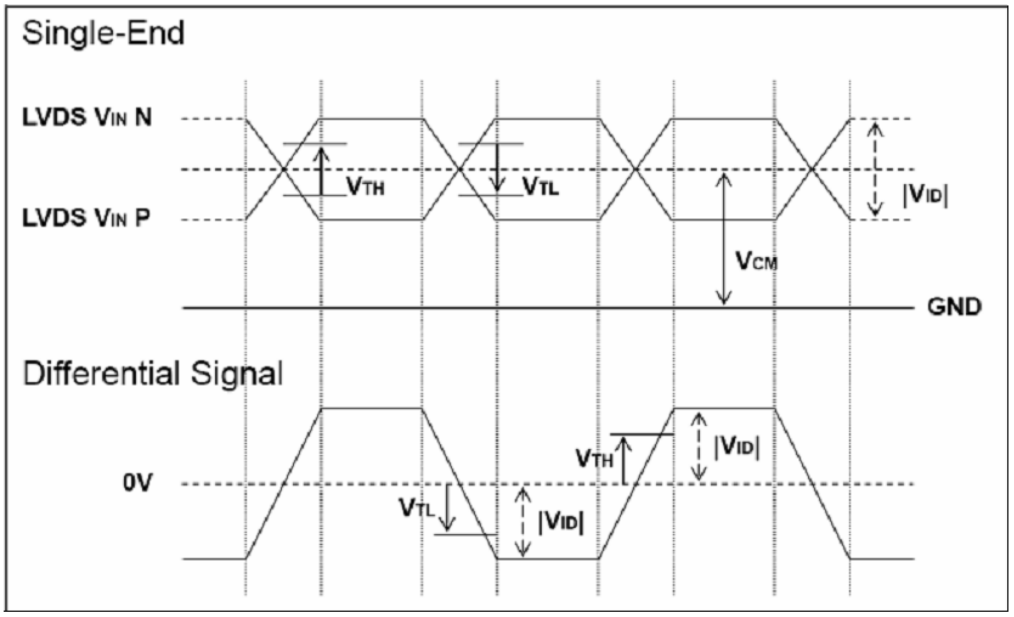
3.0 SIGNAL Characteristic

Input signals shall be low or Hi-Z state when VDD is off. Please refer to specifications of SN75LVDS82DGG (Texas Instruments) in detail.

Each signal characteristics are as follows;

Symbol	Parameter	Min	Typ	Max	Units	Condition
V_{TH}	Differential Input High Threshold	-	-	+100	[mV]	V_{CM} = 1.2V ***Note 1***
V_{TL}	Differential Input Low Threshold	-100	-	-	[mV]	V_{CM} = 1.2V ***Note 1***
$\lvert V_{ID} \rvert$	Input Differential Voltage	100	400	600	[mV]	***Note 1***
V_{CM}	Differential Input Common Mode Voltage	+1.0	+1.2	+1.5	[V]	V_{TH}-V_{TL} = 200mV (max) ***Note 1***

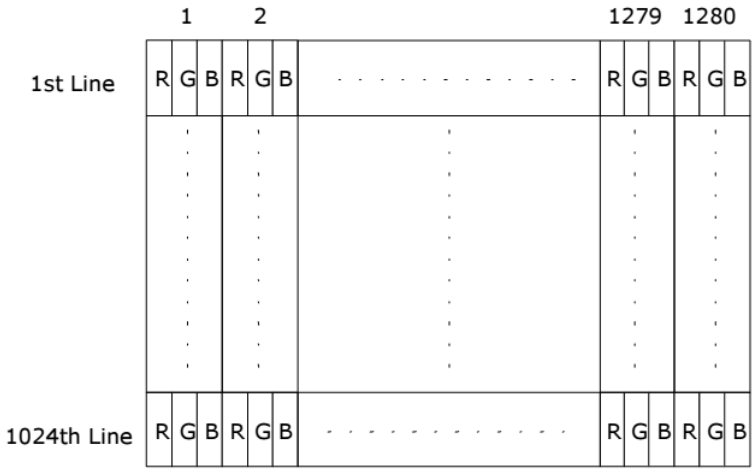
Note1: LVDS Signal Waveform



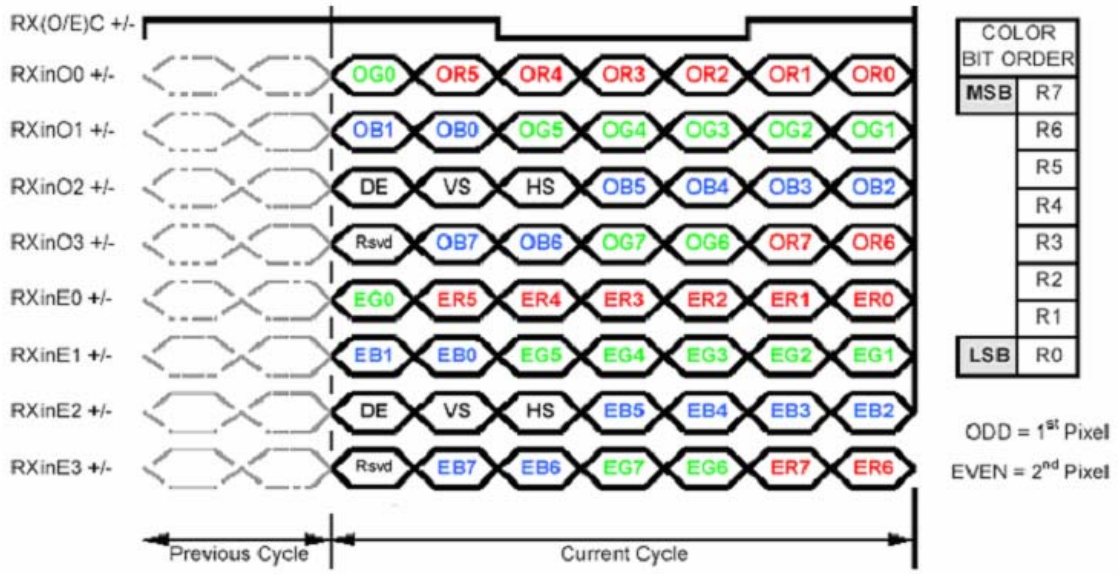
Signal Characteristic

Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.



The Input Data Format



Note1: DE only , VS, HS on EVEN channel are not used.

Note2: Please follow PSWG.

Note3: 8-bit in

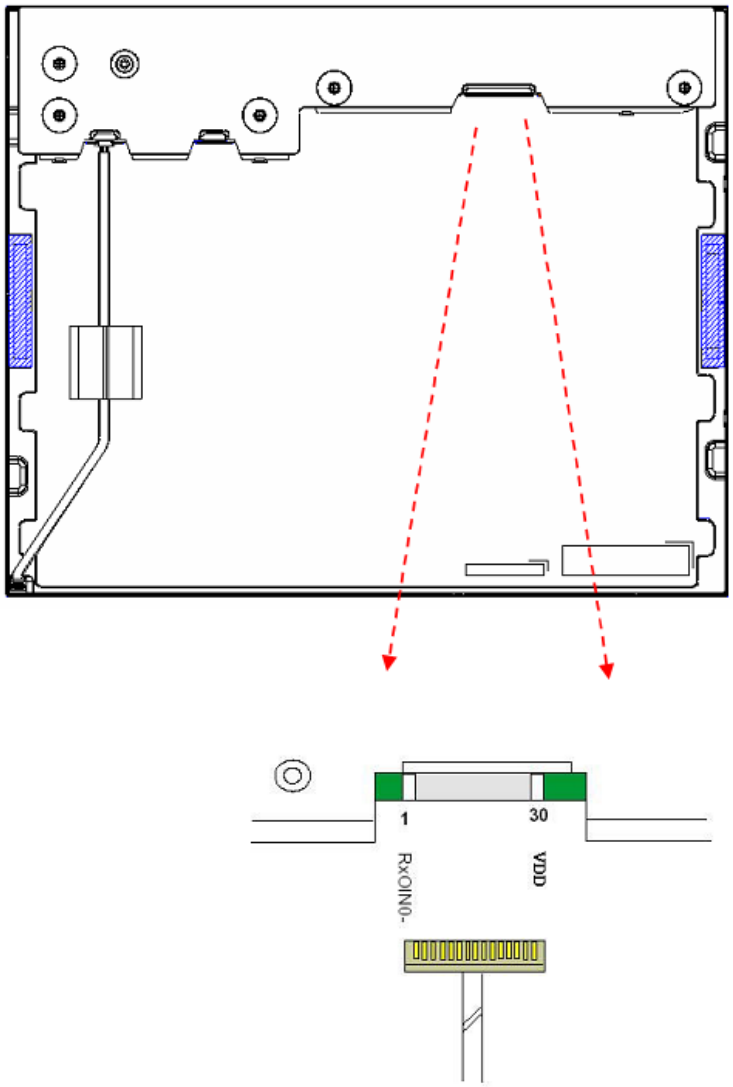
Signal Description

The module using one LVDS receiver SN75LVDS82(Texas Instruments). LVDS is a differential signal technology for LCD interface and high speed data transfer device. LVDS transmitters shall be SN75LVDS83(negative edge sampling). The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

PIN #	SIGNAL NAME	DESCRIPTION
1	RxOIN0-	Negative LVDS differential data input (Odd data)
2	RxOIN0+	Positive LVDS differential data input (Odd data)
3	RxOIN1-	Negative LVDS differential data input (Odd data)
4	RxOIN1+	Positive LVDS differential data input (Odd data)
5	RxOIN2-	Negative LVDS differential data input (Odd data, DSPTMG)
6	RxOIN2+	Positive LVDS differential data input (Odd data, DSPTMG)
7	GND	Power Ground
8	RxOCLKIN-	Negative LVDS differential clock input (Odd clock)
9	RxOCLKIN+	Positive LVDS differential clock input (Odd clock)
10	RxOIN3-	Negative LVDS differential data input (Odd data)
11	RxOIN3+	Positive LVDS differential data input (Odd data)
12	RxEIN0-	Negative LVDS differential data input (Even data)
13	RxEIN0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RxEIN1-	Positive LVDS differential data input (Even data)
16	RxEIN1+	Negative LVDS differential data input (Even data)
17	GND	Power Ground
18	RxEIN2-	Negative LVDS differential data input (Even data)
19	RxEIN2+	Positive LVDS differential data input (Even data)
20	RxECLKIN-	Negative LVDS differential clock input (Even clock)
21	RxECLKIN+	Positive LVDS differential clock input (Even clock)
22	RxEIN3-	Negative LVDS differential data input (Even data)
23	RxEIN3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	GND	Power Ground
26	GND	Power Ground
27	GND	Power Ground
28	POWER	Power +5V
29	POWER	Power +5V
30	POWER	Power +5V

Note: “Power Ground” stands for 0V.

Note1: Start from left side



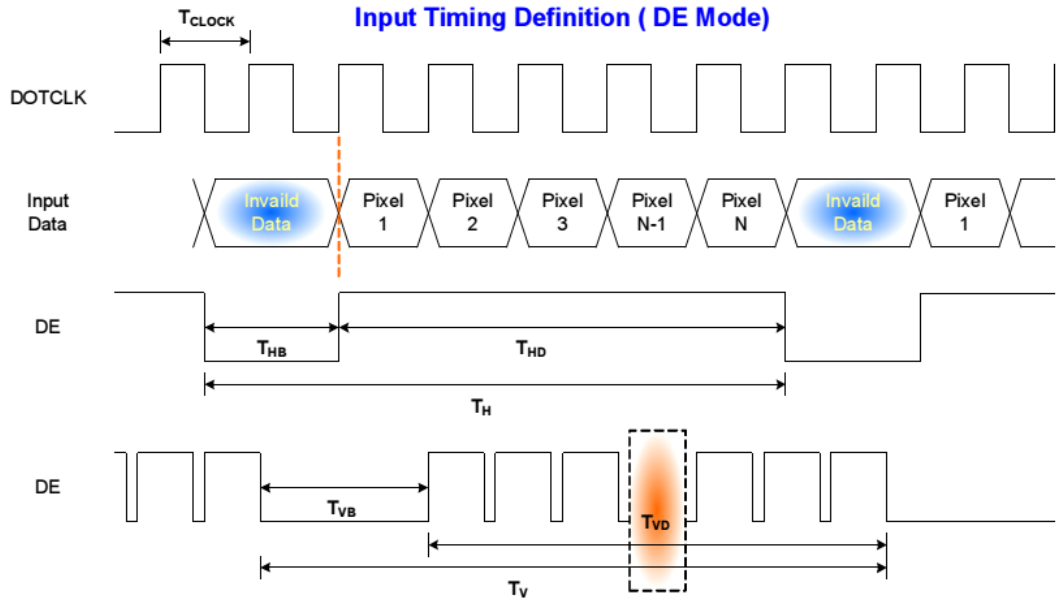
Note2: Input signals of odd and even clock shall be the same timing.

4.0 TIMING Characteristics

Signal	Item	Symbol	Min	Typ	Max	Unit
Vertical Section	Period	Tv	1032	1066	1150	Th
	Active	Tdisp(v)	1024	1024	1024	Th
	Blanking	Tbp(v)+Tfp(v)+PWvs	8	42	126	Th
Horizontal Section	Period	Th	780	844	2047	Tclk
	Active	Tdisp(h)	640	640	640	Tclk
	Blanking	Tbp(h)+Tfp(h)+PWhs	140	204	-	Tclk
Clock	Period	Tclk	22.2	18.52	14.81	ns
	Frequency	Freq.	44	54	67.5	MHz
Frame Rate	Frequency	1/Tv	49	60	75	Hz

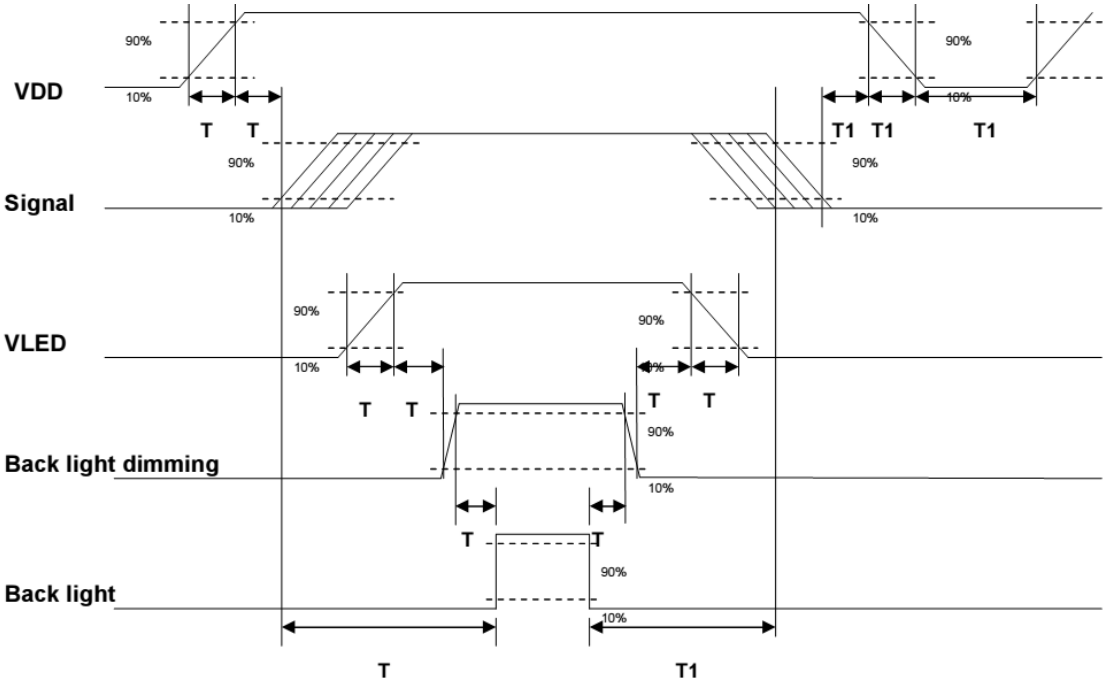
Note: DE mode only

Timing Diagram



Power ON/OFF Sequence

VDD power and lamp on/off sequence are as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	0.5	-	10	[ms]
T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	0	-	-	[ms]
T8	10	-	-	[ms]
T9	-	-	10	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

5.0 CONNECTOR and PIN ASSIGNMENT

Physical interface is described as for the connector on module.These connectors are capable of accommodating the following signals and will be following components.

TFT LCD Module
Connector

Connector Name / Designation	Interface Connector / Interface card
Manufacturer	HRS
Type Part Number	DF14H-30P-1.25H
Mating Housing Part Number	DF14H-30S-1.25C

Pin Assignment

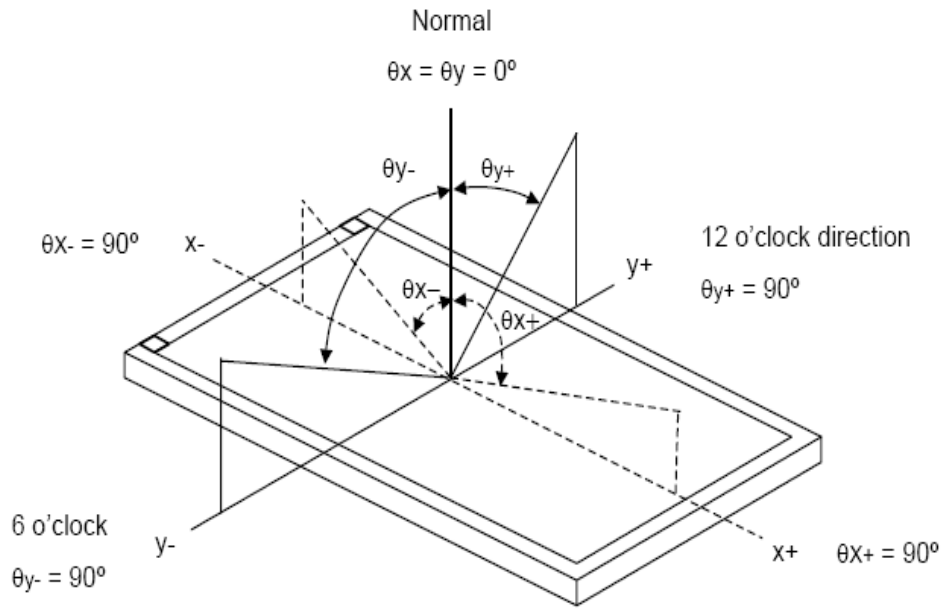
Pin#	Signal Name	Pin#	Signal Name
1	RxOIN0-	2	RxOIN0+
3	RxOIN1-	4	RxOIN1+
5	RxOIN2-	6	RxOIN2+
7	GND	8	RxOCLKIN-
9	RxOCLKIN+	10	RxOIN3-
11	RxOIN3+	12	RxEIN0-
13	RxEIN0+	14	GND
15	RxEIN1-	16	RxEIN1+
17	GND	18	RxEIN2-
19	RxEIN2+	20	RxECLKIN-
21	RxECLKIN+	22	RxEIN3-
23	RxEIN3+	24	GND
25	GND	26	GND
27	GND	28	POWER
29	POWER	30	POWER

6.0 OPTICAL SPECIFICATION

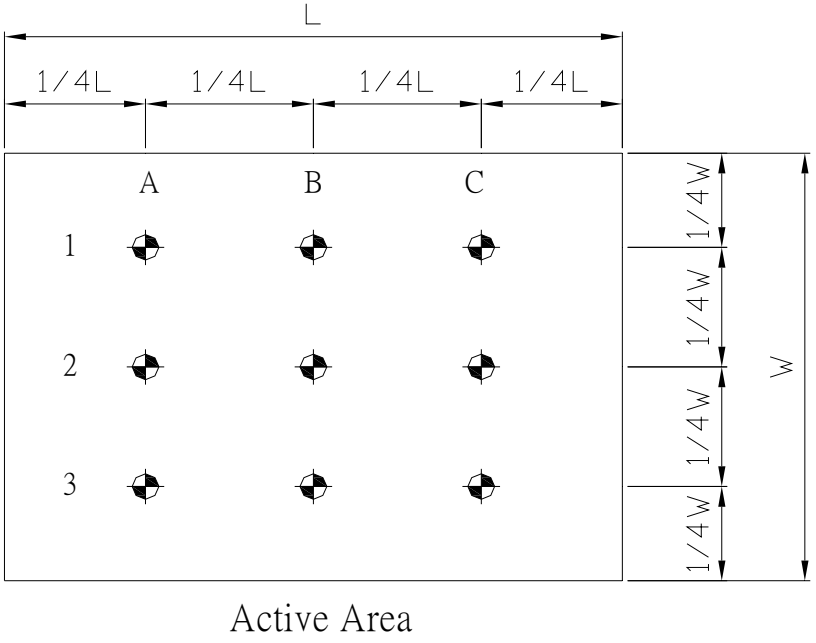
Item		Symbol	Condition	Data	Unit	Note
Color chromaticity	**Red**	**Rx**	**θx=0 θy=0 BM-7**	0.643	-	Test Mode：(**1**)(**2**)(**3**)
		Ry		0.343	-	
	Green	**Gx**		0.324	-	
		Gy		0.629	-	
	Blue	**Bx**		0.144	-	
		By		0.061	-	
	White	**Wx**		0.311	-	
		Wy		0.349	-	
Center Luminance of White		**Lc**		1600	**cd/㎡**	
Uniform		**Lu**		80	%	
Contrast Ratio		**CR**	**θx=0 θy=0 Klein K-10**	1000:1	-	Test Mode：(**1**)(**4**)
Color Saturation		**NTSC**		80	%	
Viewing Angle	**Horizontal**	**θx+**	**CR≧10**	85	**Deg**	Test Mode：(**1**)(**3**)
		θx-		85		
	Vertical	**θy+**		80		
		θy-		80		

Test Mode：

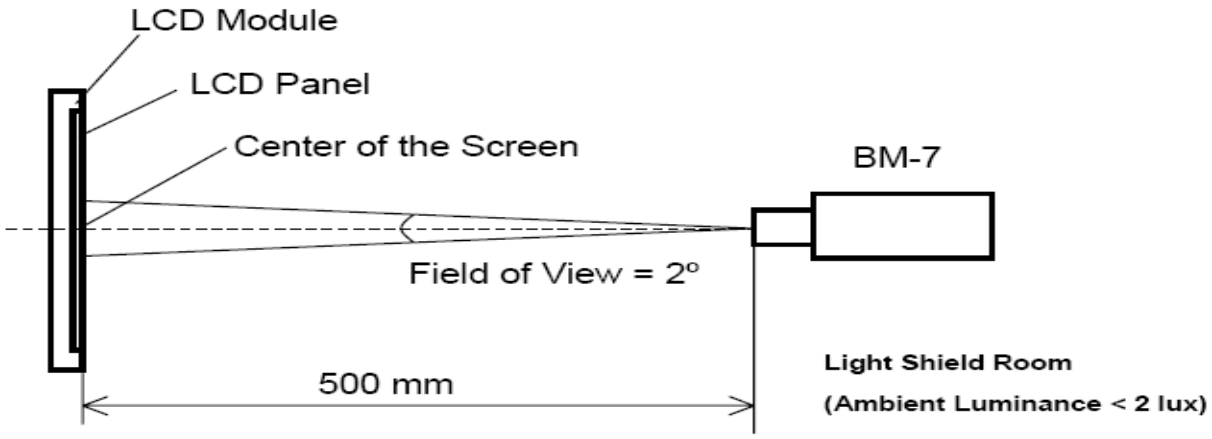
(**1**) Definition of Viewing Angle (θx，θy)：



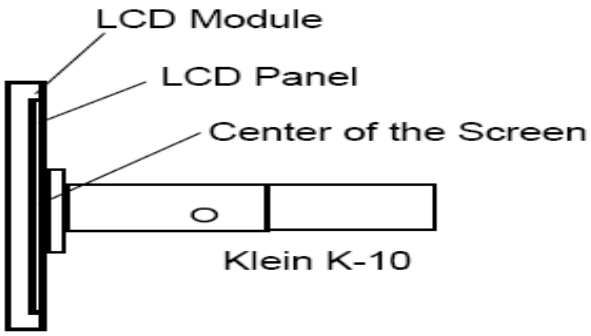
（**2**） Definition of Test Point：



（**3**）**BM-7** Measurement Setup**:**



（**4**）**Klein K-10** Measurement Setup**:**



7.0 LED DRIVING BOARD SPECIFICATIONS

1. LED Application

This specification is applied to LED converter unit for DLO1968-U (WT) (1600 nits) LED backlight.

2. Operating Characteristics

Item	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		10.0	12.0	14.0	V	
Input Current (Low Brightness)	IinL	VIN=12V,Vadj=5V	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	VIN=12V,Vadj=0V	3.28	2.88	2.6	A	
LED Current (Low Brightness)	IoutL	VIN=12V,Vadj=5V	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	VIN=12V,Vadj=0V	1.1	1.16	1.23	A	
Working Frequency	Freq	VIN=12V,Vadj=0V	210	230	250	KHZ	
Brightness Control	Vadj	Connection of Voltage	0.2	-----	4.8	V	Vadj±5%
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff	Normal Operation	0	-----	1.8	V	
Output Voltage	Vout	VIN=12V,Vadj=0V	27.4	27.52	27.72	V	
Efficiency	η	VIN=12V,Vadj=0V	91.8	92.3	93.5	%	

3. Connector Socket

3-1. Input Connector :J1(JST S8B-PH-SM3-TB or Compatible)

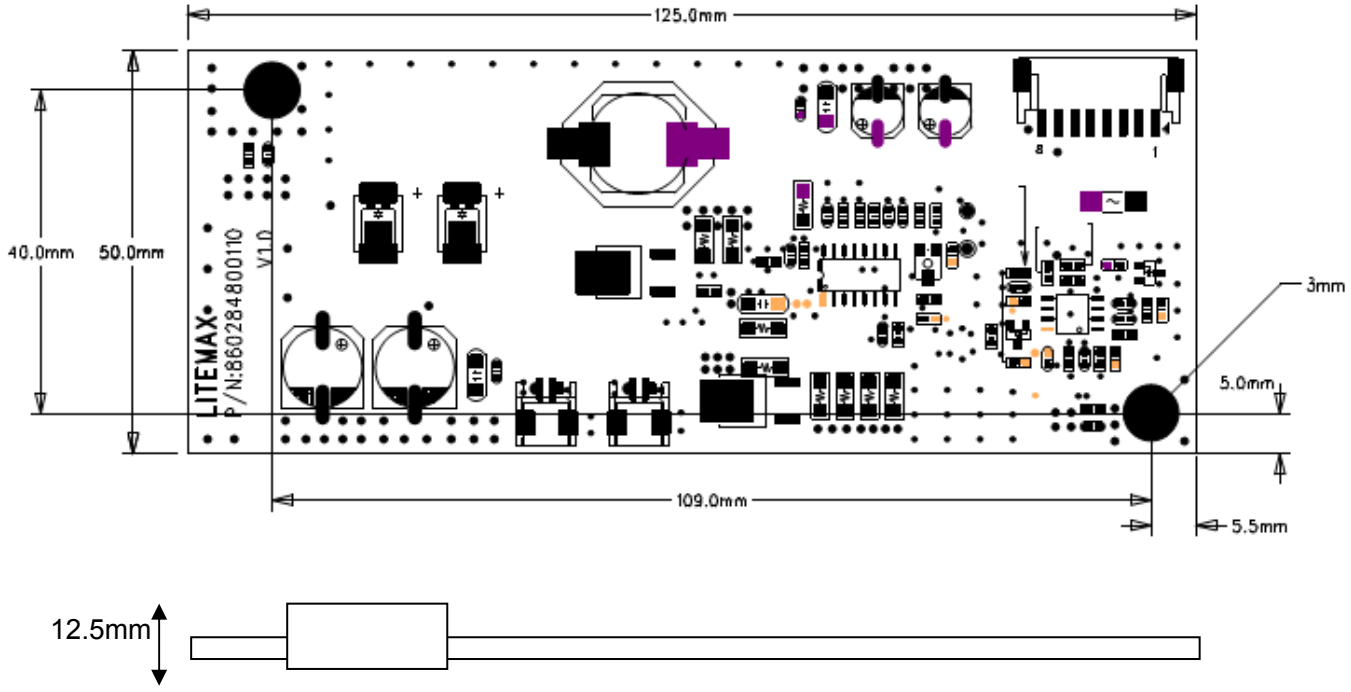
PIN No	Symbol	Description
1	Vin	VDC+
2	Vin	VDC+
3	Vin	VDC+
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control

3-2. Output Connector :J2,J3(JST S2B-EH or Compatible)

PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

4. Mechanical Characteristics

Dimension: 125 x 50 x 12.5mm

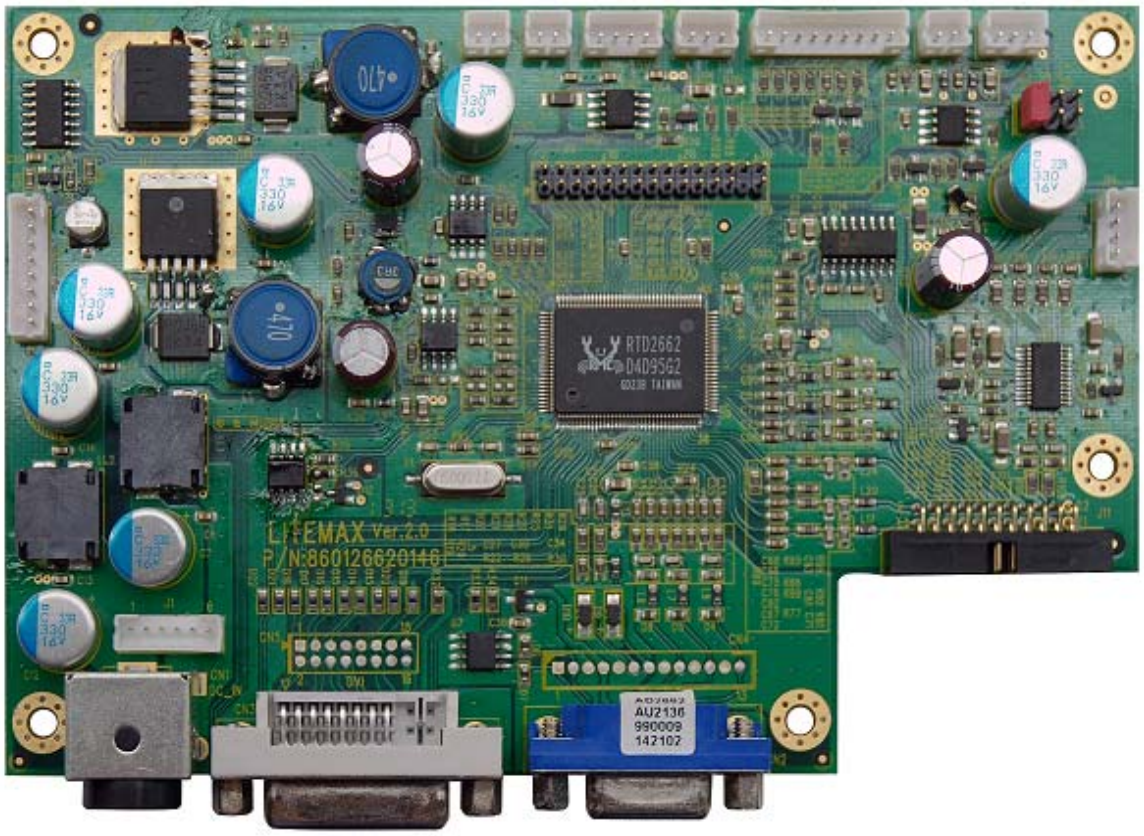


8.0 AD2662GDVAR SPECIFICATIONS

We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has an external luminance sensor as an option, an optional VR button to control brightness, fan rotation and RS232. Rev.1 is European RoHS compliant.

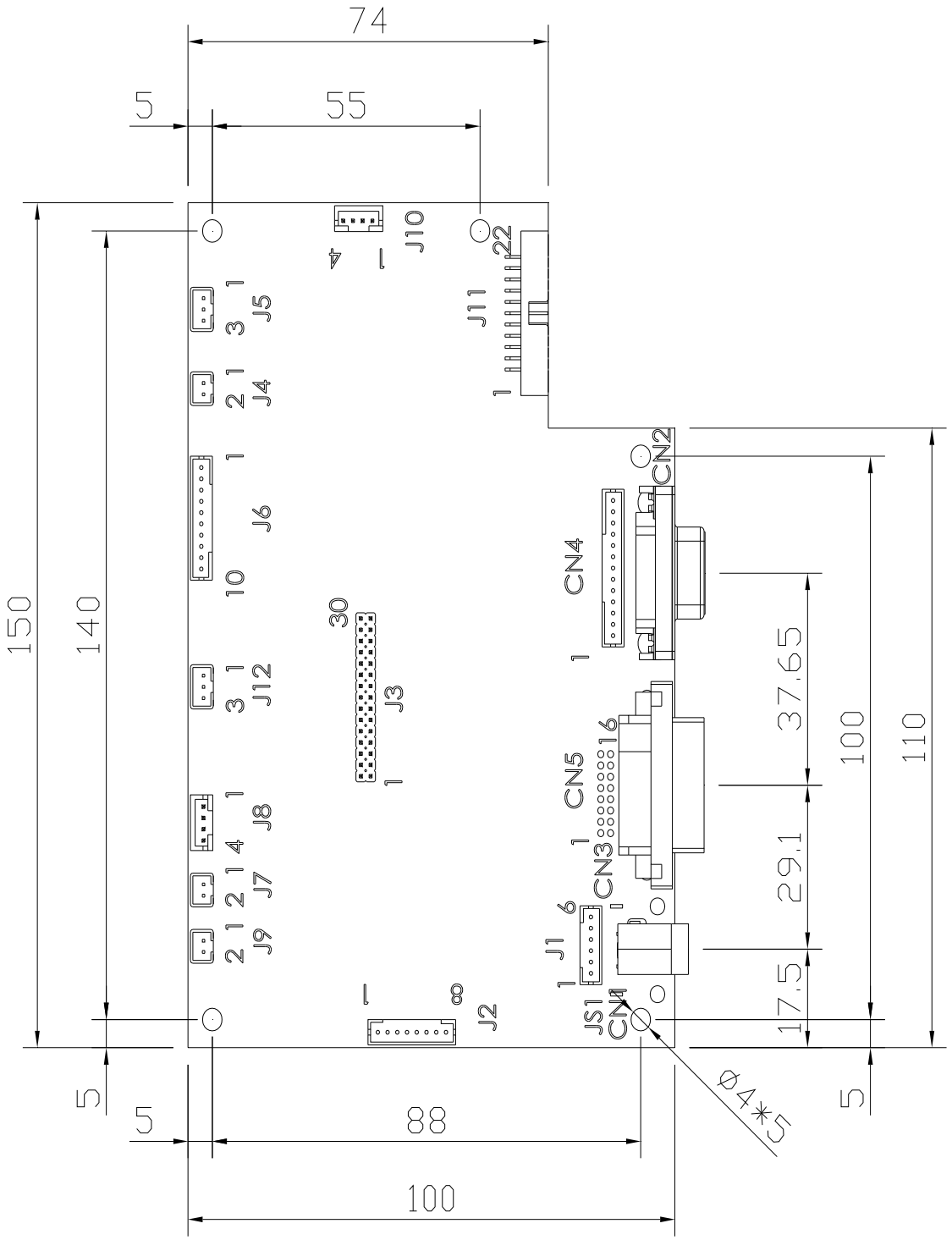
General Description

- Max Resolution Up To WUXGA
- Analog RGB Input up to 205MHz
- ULTRA-RELIABLE DVI INPUT
- Dual/single LVDS interface
- Support Panel DC5V or 3.3V, 12V Output
- External Fan Control by Software
- OSD Control
- Inverter Analog or PWM Dimming Control
- *External V.R. brightness control (optional)
- *External light sensor brightness control (optional)
- *External RS232 control (optional)
  Input Power 12Vdc
- CBVS, S-VIDEO, **YCbCr (optional) INPUT
- Audio in and b2Wx2 Audio Out(optional)
  IR Remove control

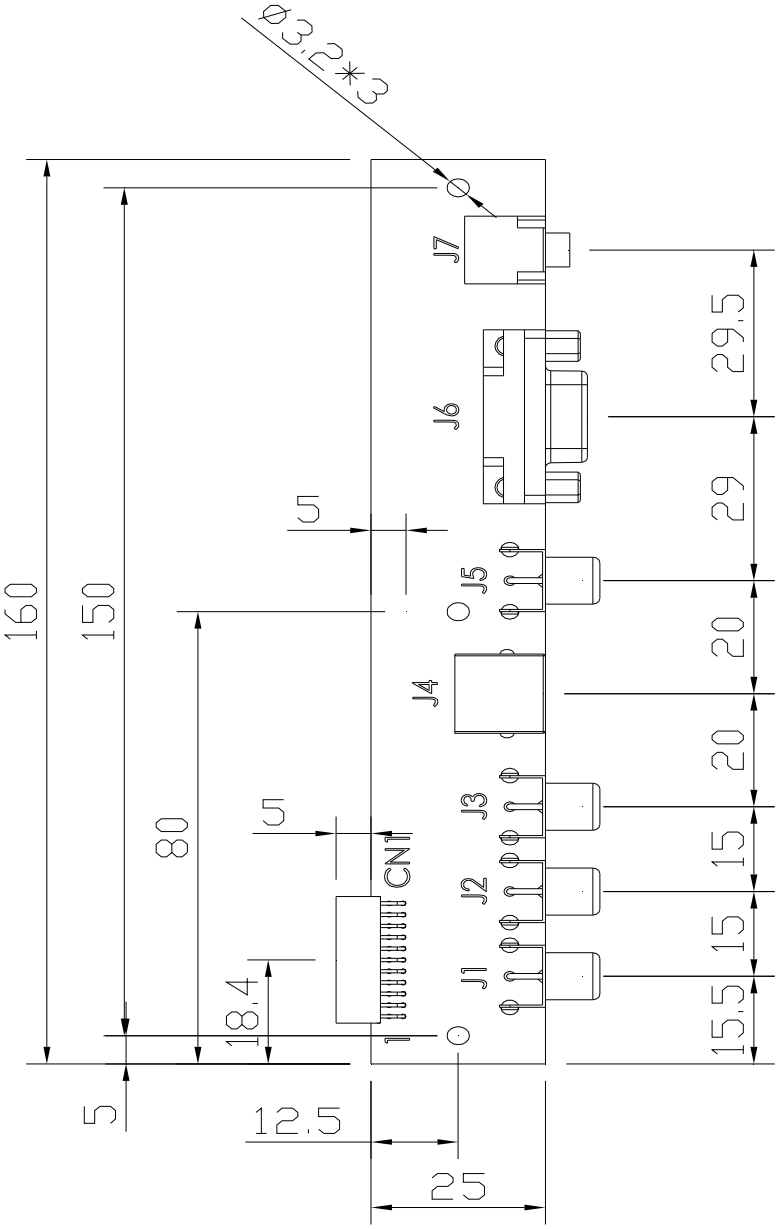


Outline Dimensions

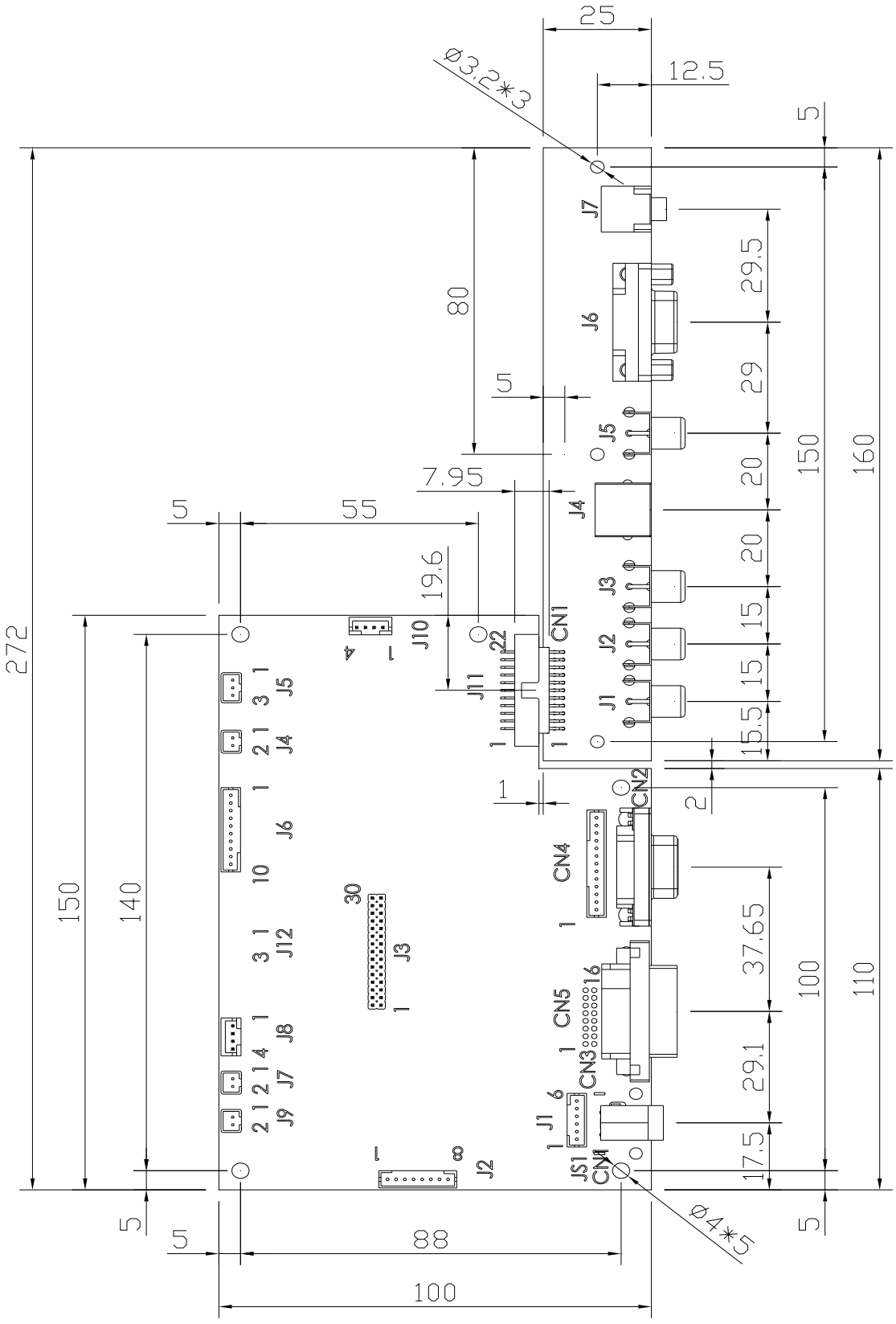
AD2662 150mmX100mmX20mm


74
5
55
150
140
110
100
37.65
29.1
17.5
5
88
100
Ø4*5
J10
J11
J5
J4
J6
J12
J3
J8
J7
J9
J2
J1
JS1
CN1
CN2
CN3
CN4
CN5

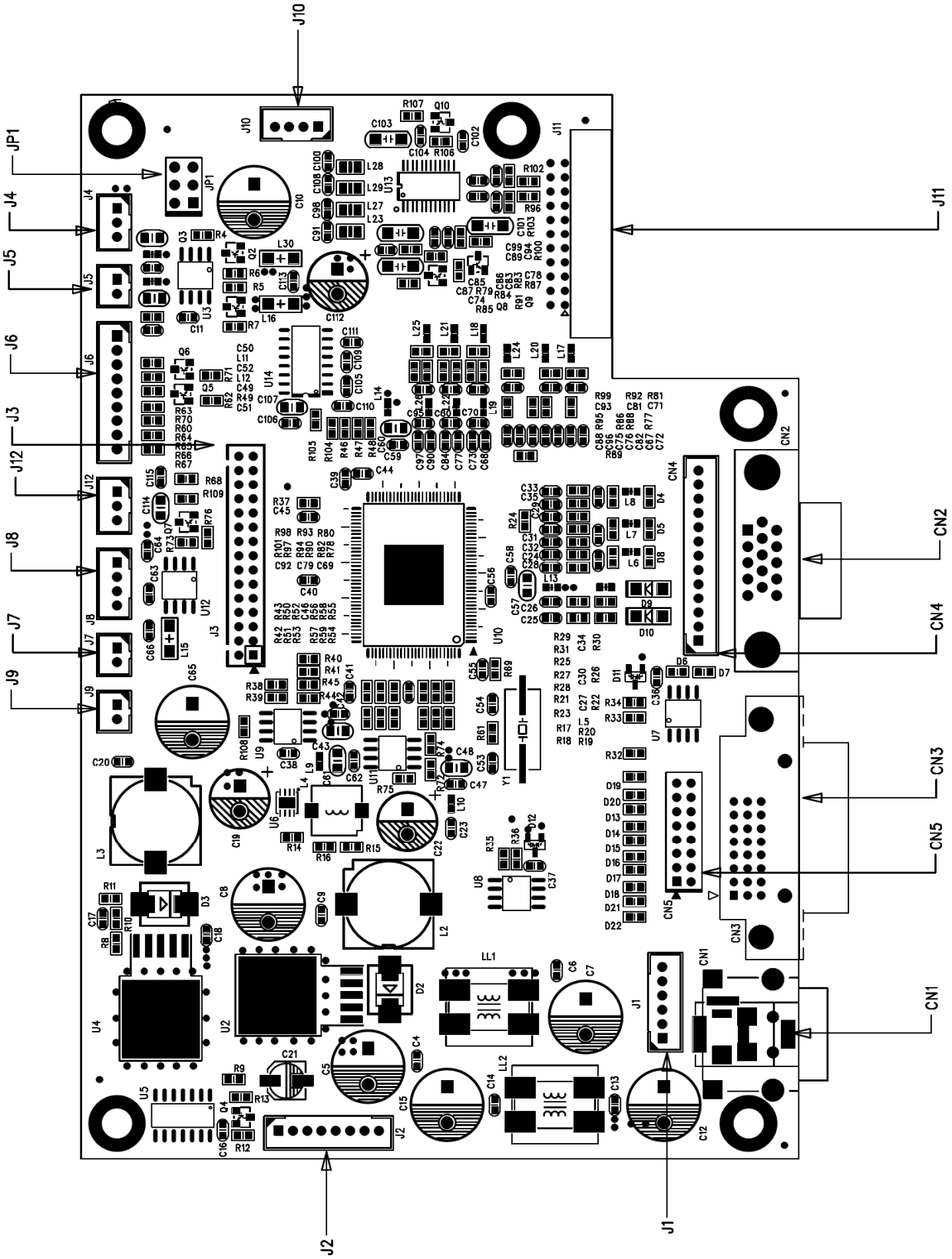
I/O BOARD 160mmX25mmX15mm



AD2662GDVAR 272mmX100mmX20mm



AD2662 Board Pin Define



J3: Panel connector

Pin No.	Function	Pin No.	Function
1	RxO0+	16	RxE1-
2	RxO0-	17	RxE2+
3	RxO1+	18	RxE2-
4	RxO1-	19	RxEC+
5	RxO2+	20	RxEC-
6	RxO2-	21	RxE3+
7	RxOC+	22	RxE3-
8	RxOC-	23	GND
9	RxO3+	24	GND
10	RxO3-	25	GND
11	GND	26	GND
12	GND	27	GND
13	RxE0+	28	PANEL-VCC
14	RxE0-	29	PANEL-VCC
15	RxE1+	30	PANEL-VCC

CN3: DVI-D INPUT Connector

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S. Clock+
8	Not Connected	16	Hot Plug Detect	24	T.M.D.S. Clock-

CN5: DVI-D Connector (16pin 2.0mm)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	RX2-	7	DDC_SDA	13	GND
2	RX2+	8	DDC_SCL	14	GND
3	RX1-	9	GND	15	DVI HP
4	RX1+	10	GND	16	DVI_5V
5	RX0-	11	RXC-		
6	RX0+	12	RXC+		

CN2: Analog RGB Input connector (D-SUB 15Pin)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	RED	Analog Red	9	+5V	+5VDDC
2	GREEN	Analog Green	10	SGND	Sync GND
3	BLUE	Analog Blue	11	NCD	Reserved
4	GND	Reserved	12	SDA	DDC Serial Data
5	NC	VGA_CAB	13	HSYNC	Horizontal Sync
6	RED_RTN	Red Return	14	VSYNC	Vertical Sync
7	GREEN_RTN	Green Return	15	SCL	DDC Data Clock
8	BLUE_RTN	Blue Return			

CN4: Analog RGB Input connector (13pin connector)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	SCL	DDC Data Clock	8	BGND	Blue Return
2	SDA	DDC Serial Data	9	BLUE	Analog Blue
3	GND	Reserved	10	GGND	Green Return
4	+5V	+5VDDC	11	GREEN	Analog Green
5	GND	Reserved	12	RGND	Red Return
6	VSYNC	Vertical Sync	13	RED	Analog Red
7	HSYNC	Horizontal Sync			

JS1: Power DIN(12V)

Pin No.	Function	Pin No.	Function
1	12VDC	2	12VDC
3	GND	4	GND

JS1: Power Jack (12V)

Pin No.	Function	Pin No.	Function
1	12VDC	2	12VDC

J1: Power connector (12V) (6PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12VDC	4	GND
2	12VDC	5	GND
3	12VDC	6	GND

J8: Power connector (5V/12v)(4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	5VDC	2	GND
3	12VDC	4	GND

J2: Inverter Connector(8PIN 2.0mm)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	ON/OFF	Backlight ON/OFF	5	GND	GND
2	BRIGHT	Dimming adjust	6	12VDC	Input 12VDC
3	GND	GND	7	12VDC	Input 12VDC
4	GND	GND	8	12VDC	Input 12VDC

J7, J9: FAN (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	FAN(+)	2	GND

J6: Key Pad (9PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	POWER KEY	6	MENU KEY
2	GREEN LED	7	AUTO KEY
3	RED LED	8	GND
4	DOWN KEY	9	GND
5	UP KEY		

J10: Speaker Connector (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK-L	2	GND
3	GND	4	SPK-R

J11 Extern Funtion Connector (11P X 2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Pb	2	Y
3	GND	4	Pr
5	GND	6	SY
7	GND	8	SC
9	GND	10	AV
11	GND	12	GND
13	TXD	14	RXD
15	GND	16	GND
17	GND	18	GND
19	Audio-R	20	Audio-L
21	GND	22	GND

J4: Ambient (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3VDC	2	Sensor Out

J5: VR connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3,3VDC	2	VR Out
3	GND		

JP1: PANEL VCC (3PIN 2.54mm)

Pin No.	Function	Pin No.	Function
1-2	12V	5-6	3.3V
3-4	5V		

I/O BOARD Pin Define

J1:Component Y

Pin No.	Function	Pin No.	Function
1	Y	2	GND

J2:Component Cb

Pin No.	Function	Pin No.	Function
1	Cb	2	GND

J3:Component Cr

Pin No.	Function	Pin No.	Function
1	Cr	2	GND

J4:S-Video

Pin No.	Function	Pin No.	Function
1	GND	2	GND
3	Luminance	4	Chrominance

J5:Composite

Pin No.	Function	Pin No.	Function
1	Y	2	GND

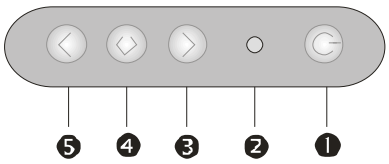
J6:D-SUB9(RS232)

Pin No.	Function	Pin No.	Function
1	NC	2	TXD
3	RXD	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC		

CN1:11P X 2 Connector

Pin No.	Function	Pin No.	Function
1	Component Cb	2	Component Y
3	GND	4	Component Cr
5	GND	6	S-Video Y
7	GND	8	S-Video C
9	GND	10	Composite
11	GND	12	GND
13	TXD	14	RXD
15	GND	16	GND
17	GND	18	GND
19	Audio IN(L)	20	Audio IN(R)
21	GND	22	GND

MEMBRANE CONTROL BUTTOM



❶**POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.

❷**Power LED:** Power ON-Green / Power off-No.

❸**Up Key >:** Increase item number or value of the selected item.

❹**Menu Key:** Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu, and the change data don't save to memory.

❺**Down Key <:** Decrease item number or item value when OSD is on.

When OSD is off, it is hot key for input switch between VGA, AV, and S-video.

Screen Adjustment Operation Procedure

1. **Entering the screen adjustment**

   The setting switches are normally at stand-by. Push the **Menu Key** once to display the main menu of the screen adjustment. The adjustable items will be displayed in the main menu.

2. **Entering the settings**

   Use the **Down Key <** and **Up Key >** buttons to select the desired setting icon and push the SELECT button to enter sub-menu.

3. **Change the settings**

   After the sub-menu appears, use the **Down Key <** and **Up Key >** buttons to change the setting values.

4. **Save**

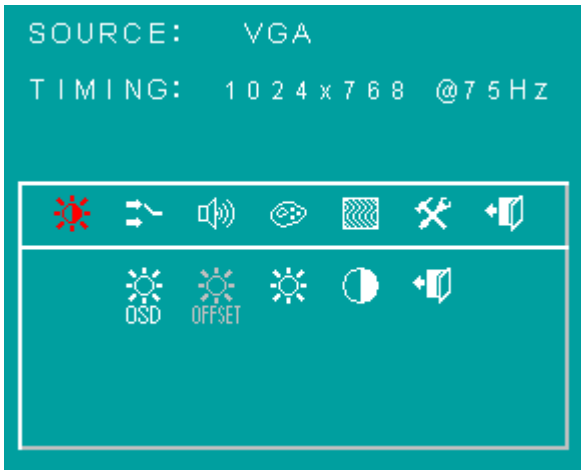
   After finishing the adjustment, push the SELECT button to memorize the setting.

5. **Return & Exit the main menu**

   Exit the screen adjustment; push the "MENU" button. When no operation is done around 30 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

OSD FUNCTIONS

Here are some instructions for you to use the OSD (On Screen Display). By pressing the “menu”, you will see the below picture.
Timing shows resolution, H-frequency,and V-frequency of the panel.Version shows the firmware control version. This 2 information is not changeable by user.



There are 7 sub pages inside the OSD manual, Brightness, Signal select, Sound, Color, Image, Tools, and Exit.

When you press “menu” button, you enter the “Brightness” sub page. You will see 5 selections:

press ’’menu’’ press ’’menu press ’’menu’’

OSD Brightness:

press ’’right’’ key

press “menu” once, you can go into adjust the brightness. Press “left” you can dim down the brightness to “0”, while press “right” you can increase the brightness to “100”.

Ambient light sensor: press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.(OPTION)

Potentiometer: press this icon, adjust VR function.(OPTION)

Ambient light sensor with OSD offset: press this Icon

Press ’menu’’ once, you can adjust min. luminance to fit your application (OPTION)

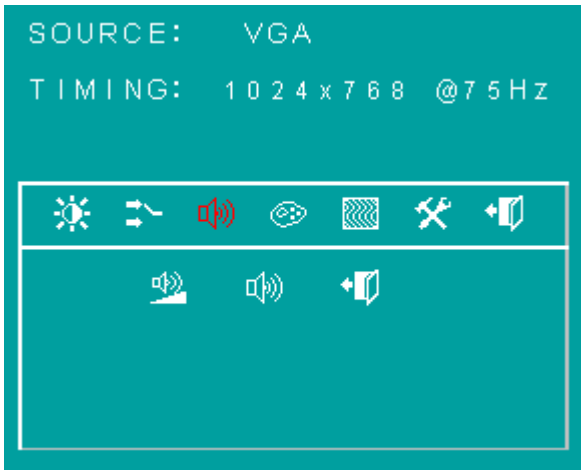
Contrast: Press “menu” and “right” you can adjust the contrast from “0” to “100” by pressing the “left” and “right”.

Exit: You can exit this sub menu back to normal screen.

Source :

There are 6 options for “Source”sub page.
There have VGA, DVI-D, AV, S-VIDEO, YPBPR source input.

Sound :



There are 3 options for “Sound” sub page.

Audio Volume: Audio volume adjustment.

Mute: You can mute the speaker by pressing this option.

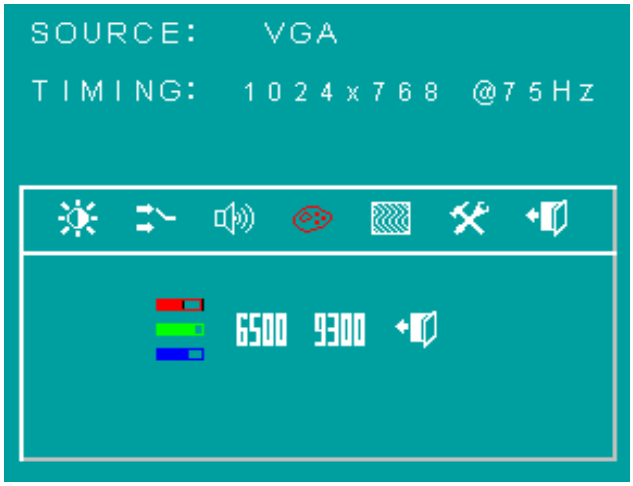
Exit: back to the normal screen.

Color :

Auto Color: by press this “Auto Color” option, you can get the optimal color performance.

SRGB: Windows standard color setting.

Color Tempture: You can have 3 options in this selection , have User/6500/9300



Color Tempture User

Color Tempture_6500K

Color Tempture_93OOK

Exit: back to the normal screen.

“user mode”, “6500K” (Warm color scheme), “9300K (Cold color scheme).
Default is “user”, and inside all “R”, “G”, and “B” are set “100”

Image :

Go into the “Image” page, you can see below picture.

Auto just: Pressing this option, the AD5621 will adjust the optimal frequency of horizontal and vertical. You will see “Auto tune….” On the screen for around 3 seconds.

Clock: If you are not satisfied about the Autotune result, you can adjust manually by “Clock”.
The screen will be “wider” if you adjust this function.

Phase: If you see “double image” on characters, you can adjust “Phase” to make it perfect image.

HPos: You can shift the screen horizontally by this function.

Vpos: You can shift the screen vertically by this function.

Exit: Back to normal screen.

TOOLS :

On the “Tools” sub menu, you will see 4 icons.

Osd Control: Select this option, you will see 4 more options:

Factory_Reset: By pressing this, the screen will be back to the factory setting on very beginning and lost all the personal settings.

Sharpness: You can make the characters looks sharper.

Exit

Osd_time: You can selection the time of OSD from 2 sec. to 16 sec.
Default is 6 sec.

Osd_HPos: You can move the OSD horizontally over the screen.

Osd_VPos: You can move the OSD Vertically over the screen.

Exit: back to main menu.

BURNIN MODE :

Factory Burn-in mode: While your VGA cable is connected on the monitor, press “Menu” and Left and Right <” simultaneously, you will see “BURN IN MODE” on the center of the screen for 3 sec. Then unplug the VGA cable, the screen will show Red, Green, Blue, White, and Black in sequence automatically.

You can plug in the VGA signal cable, and re-plug the power connector to exit the burn-in mode.

KEY LOCK MODE :

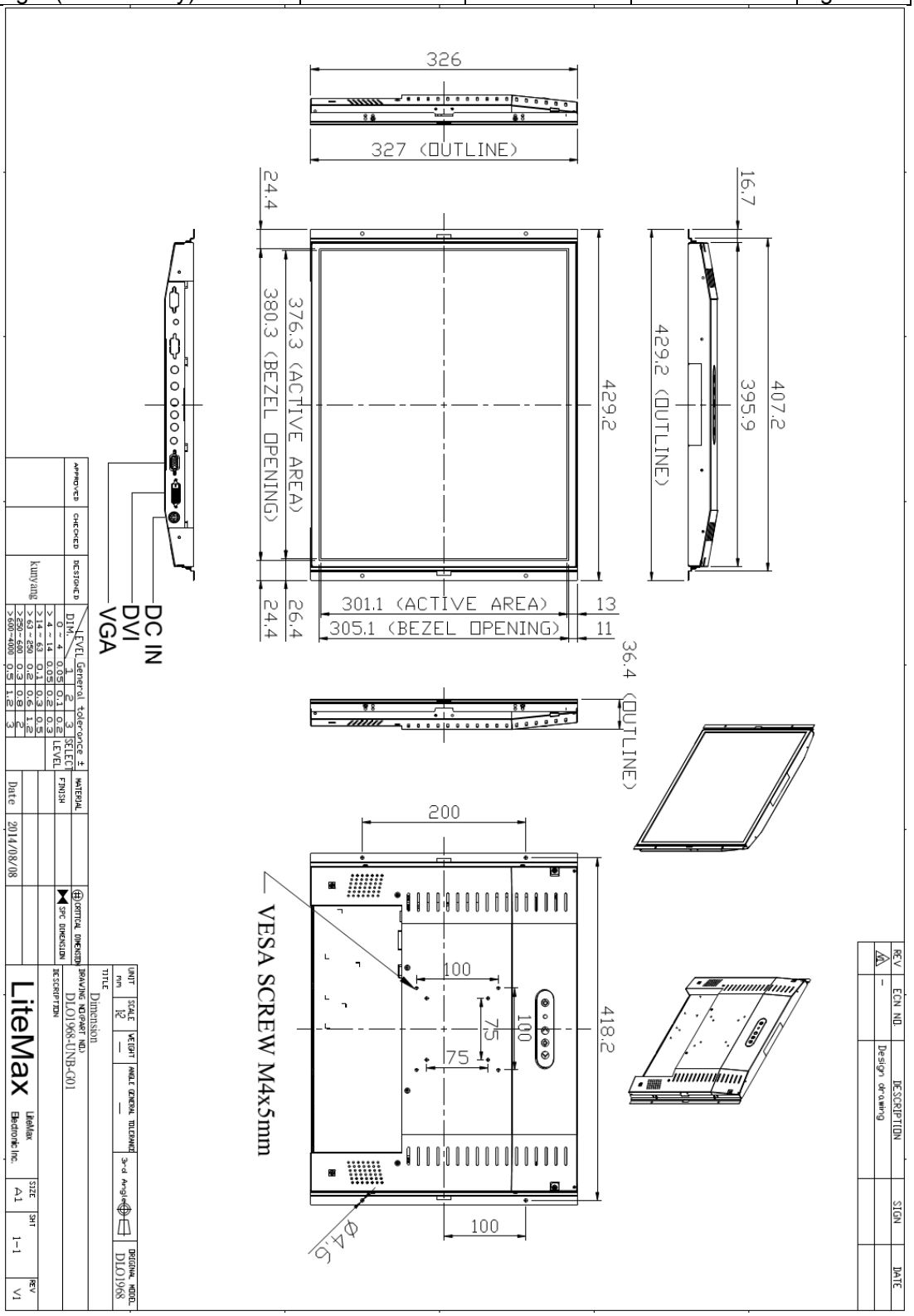
OSD Lock Function: It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing “Menu” and “right >” buttons simultaneously. You will see the “lock” icon below on the center of the screen for 3 seconds. If any button is pushed after the lock function is initiated, the below icon will appear on the screen.'

To release the OSD lock, press “Menu” and “Right >”. The below icon will appear on the center of the screen for 3 seconds. Now all OSD keys are active again.

9.0 MECHANICAL CHARACTERISTICS

DLO1968-U

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	-	429.2	-	mm
	Vertical(V)	-	326	-	mm
	Depth(D)	-	36.4	-	mm
Weight (Module only)		-	3.2	-	kg



10.0 PRECAUTIONS

HANDLING PRECAUTIONS

(1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
(2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
(5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(8) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(9) Do not disassemble the module.
(10) Do not pull or fold the lamp wire.
(11) Pins of I/F connector should not be touched directly with bare hands.

STORAGE PRECAUTIONS

(1) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
(2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(3) It may reduce the display quality if the ambient temperature is lower than 10 ºC. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

OPERATION PRECAUTIONS

(1) Do not pull the I/F connector in or out while the module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.